REMARKS

Upon entry of the present Amendment, claims 1-8, 38, 41, 42, 44, 45, 50, and 51 are all the claims pending in the application. New claim 51 is added. No new matter is presented.

Claims 38, 42, 45 and 50 are allowed. Claims 1-8, 41 and 44 are rejected. The outstanding rejections are traversed, as discussed below.

Claim Rejections - 35 U.S.C. § 103

Claims 1, 2, 5-8, 41 and 44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mantell (U.S. Patent No. 6,189,993) in view of Billet (U.S. Patent No. 6,010,205). Applicant respectfully traverses and submits that the combination of features recited by these claims would not have obvious in view of Mantell or Billet, whether taken alone or in combination.

Claim 1 defines an ink jet recording apparatus comprising, *inter alia*, a recording head provided with a pressure generating element; a scanning mechanism for moving the recording head in a main scanning direction; a data developer for developing print data into multi-bit jetting data; a drive signal generator for generating a drive signal including a plurality of drive pulses, on every unit print cycle; a translator for translating the multi-bit jetting data into pulse select information associated with the respective drive pulses; a drive pulse supplier for selectively supplying at least one of the drive pulses to the pressure generating element in accordance with the pulse select information to drive the pressure generating element; a ***basic recording mode*** for recording a dot having a size which is selected from one of a plurality of sizes, in a basic unit pixel which is associated with a unit recording area corresponding to the

unit print cycle; a ***high-resolution recording mode*** for recording a dot in a fine unit pixel, a plurality of fine unit pixels being arranged within the unit recording area in the main scanning direction; a scanning controller for causing the scanning mechanism to move the recording head in the main scanning direction; and a mode selector for selecting ***one of plural recording modes*** including the basic recording mode and the high-resolution recording mode.

As further recited, the data developer develops the print data into the jetting data so as to ***indicate the size of the dot*** to be recorded in the basic unit pixel when the mode selector selects the ***basic recording mode***; the data developer develops the print data into the jetting data such that each bit therein indicates whether the recording is conducted or not ***in each associated fine unit pixel***, when the mode selector selects the ***high-resolution recording*** mode, and wherein the same drive signal is used in each of the basic recording mode and the high resolution recording mode. In addition, claim 1 recites, the scanning controller causes the scanning mechanism to move the recording head ***at the same speed irrespective of the one of the plural recording modes selected*** by the mode selector.

In the grounds of rejection, the Examiner contends that Mantell teaches all the features of claim 1 except the limitation of the scanning controller causes the scanning mechanism to move the recording head at the same speed irrespective of the one of the plural recording modes selected by the mode selector. To compensate for this deficiency, the Examiner turns to Billet, which is alleged to disclose "that by operating a device at the same speed regardless of a printing mode, nozzles are not operating at their maximum firing frequency for all the print modes, and compensation for inoperative nozzles can be conducted by activating operative nozzles in their place (column 8, lines 56-63)." The Examiner further contends that it would have been obvious "to move the carriage at a constant velocity regardless of the print mode, as suggested by Billet,

for the purpose of enabling inoperative nozzles to be compensated by operative nozzles." (Office Action at 5.)

Applicant respectfully disagrees that the purported modification of Mantell with the teaching of Billet would have been obvious. For instance, Mantell itself teaches away from the claim feature of moving the scanning mechanism at the ***same*** speed irrespective of the one of the plural record modes (i.e., the basic recording mode and the high-resolution recording mode) that is selected. Indeed, Mantell repeatedly teaches quite the opposite--that the carriage velocity is to be ***variable*** depending on print mode selection:

- "In addition, the level of grayscale selected is used to control the velocity of the carriage 14 as it scans across the pages, such that a range of grayscales, or print modes are available to the user depending on the desired quality of output in the final document. ***By controlling the carriage speed*** relative to the grayscale, print quality selected, or printing method, such as checkerboarding, a number of ***advantages*** are possible" (7:22-29.) (emphasis added.)
- "The present invention includes a printhead carriage capable of scanning at ***multiple velocities***." (7:31-33.) (emphasis added.)
- "One important characteristic of the present invention is that the velocity of the carriage is set by the print driver according to the level of grayscale which is selected." (7:44-46.)
- "A carriage velocity selector 124 then analyzes the media type as well as the print quality type. Based upon the combination thereof, one of four or more print carriage velocities stored in, for instance, a velocity lookup table 126 are selected." (8:1-5.)

Thus, in accordance with Mantell's teaching, the multiple print modes, such as shown in Fig. 3 demonstrating different grayscale modes, are necessarily dependent on different carriage speeds that are selected in accordance with the particular mode. (See Mantell at 5:57-6:8.)

Billet, on the other hand, teaches that malfunctioning nozzles of an ink jet print head can be compensated by other nozzles that would otherwise not be used during a particular scan, but only when the nozzle firing speed is less than the maximum rate: "However, in modes of operation wherein the nozzle firing speed is not at its maximum, compensation for malfunctioning nozzles can be implemented." (Billet at 8:56-58.) Specifically, Billet teaches that in the case of a 50% overlap print mode, an earlier scan or subsequent scan can be used to produce not only dots for a given scan, but to print dots which should have been printed in a different scan over the same band by appropriate modification to the control of the print head. (Billet at 9:10-19.)

The teaching of Billet, however, would not only fundamentally change the principle of Mantell's manner of printing by eliminating the multiple print velocities that Mantell emphasizes as being important, but the purported combination of these teaching would in effect prevent Mantell from achieving different print modes at all. Indeed, it is by varying the carriage velocity itself that Mantell is able to realize different grayscales or print qualities. Likewise, Billet provides no motivation to modify the carriage speed such that the velocity is the same for both the basic recoding mode and high resolution mode, as claimed, where the print data indicates the size of the dot to be recorded in the basic unit pixel in the basic recoding mode and the print data indicates whether or not recording is conducted in each associated fine unit pixel. Rather, Billet simply describes overlap and non-overlap print modes.

In view of the foregoing, Applicant submits that claim 1 would not have been obvious in view of Mantell and Billet, at least because the references would teach one away from the invention as claimed, and that Mantell's teaching is incompatible with the teaching of Billet, which would not only fundamentally change Mantell's principle of operation, but render

Mantell's device incapable of achieving its different print modes. As such, one of ordinary skill would not have been motivated to combine their teachings.

Reconsideration and withdrawal of the rejection of claim 1 is requested. Applicant further submits that claims 2-8, 41 and 44 are allowable at least by virtue of their dependency.

New Claim

New claim 51 is added. Claim 51 recites, *inter alia*, an ink jet recording apparatus comprising: a recording head provided with a pressure generating element; a data developer for developing print data into multi-bit jetting data; a drive signal generator for generating a drive signal including a plurality of drive pulses; a drive pulse supplier for selectively supplying at least one of drive pulses to the pressure generating element in accordance with the print data; and a mode selector for selecting one a plurality of recording modes including a first recording mode and a second recoding mode, wherein: a number of gradation levels that can be recorded in the first recording mode is greater than a number of gradation levels that can be recorded in the second recording mode; and the same drive signal is used in each of the first recording mode and the second recording mode.

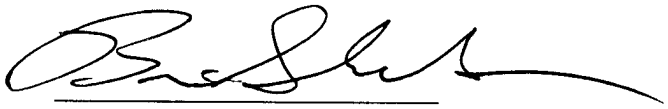
Applicant submits that claim 51 is allowable at least because Mantell does not teach or suggest the feature of the same drive signal, which includes a plurality of drive pulses, is used in each of the first recording mode and the second recording mode, in which the number of gradation levels that can be recorded in the first recording mode is greater than a number of gradation levels that can be recorded in the second recording mode, as claimed in combination with the remaining elements of the claim. Allowance of claim 51 is requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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